OSTEOPOROSIS IN STROKE: IMPLEMENTATION OF A FRACTURE RISK ASSESSMENT TOOL

Stacey E. Frasher, BSN, RN, SCRN, DNP-FNP Student
University of Missouri Sinclair School of Nursing

Sinclair School of Nursing
University of Missouri Health

INTRODUCTION

Problem

Changes in bone mineral density and risk of fracture following stroke are rarely addressed. Fracture risk assessment tools are available, however, stroke guidelines provide little advice. Emphasizing early identification of those high risk for facture can promote prevention efforts, guide treatment decisions, and decrease long-term complications related to stroke.

- Patients who survive an acute stroke face numerous early and late complications; of these, hip fracture is the most serious and disabling. Up to 30% of patients with a fractured neck of femur die within a year of the acute event, but survivors face pain, disability, and loss of independence (Poole, Reeve, & Warburton, 2002).
- Stroke patients can have diminished levels of awareness from neglect or hemisensory loss, predisposing them to repeated limb trauma, accidental falls, and progressive osteoporosis of the paretic side, which precipitates post-stroke fractures (Poole, Reeve, & Warburton, 2002).
- Bone loss has been found to start in the days immediately following stroke and progressively accrues until the 3rd to 4th month, with individuals losing up to 14% BMD at the proximal femur and 17% in the upper extremities during the first year following stroke (Carda, Cisari, Invernizzi, & Bevilacqua, 2009).
- Under-appreciation of fracture risk and low levels of assessment were found in a anonymous survey of healthcare professionals, while fall risk was regularly recognized and assessed (Gaskell, Choulerton, Shaw, & Gregson, 2016).
- The American Heart Association and American Stroke Association have reported that interventions in the early recovery phase can minimize disability, improve functional outcomes, and enhance quality of life for individuals and their families (Winstein et al., 2016).

PICOT

- In adults aged 40 to 90 admitted to the inpatient rehabilitation unit with primary diagnosis of stroke (P), will educating nursing staff on use of the FRAX screening tool (I), compared to regular care (C), be effective in increasing use of FRAX screening in eligible patients during hospital stay, identifying low, intermediate, high risk individuals, and identifying correlation between patient characteristics and fracture risk (O) over a 2 month time period (T)?

OBJECTIVES

1. 75% of floor nurses will receive education on FRAX tool utilization.
2. 50% of eligible stroke patients will have FRAX screening completed and receive education regarding risk at 1-month.
3. 75% of eligible stroke patients will have FRAX screening completed and receive education regarding risk at 2-months.

sef625@mail.missouri.edu
Sinclair SON URL http://nursing.missouri.edu/index.php

MATERIALS AND METHODS

Design

A quality improvement project was implemented to evaluate the feasibility and effectiveness of implementing the FRAX Screening tool in hospitalized stroke patients on a rehabilitation unit. The project followed a longitudinal, pilot project design. There was no baseline data to collect because the screening tool has never been used in this setting before. The project primarily evaluated the nursing outcome of compliance with screening.

Setting & Population

The setting for this project was a 17-bed rehabilitation unit at Saint Luke's Hospital (SLH) of Kansas City. The physical medicine team at SLH examines hospitalized patients 6 days a week and begin therapy 24 to 36 hours after experiencing neurological trauma, therefore this setting was ideal for implementation of the FRAX and highlighting the importance of bone health.

FRAX Tool

The FRAX screening tool (Figure 1) estimates the risk and probability of fracture in untreated patients aged 40 to 90. The output is a 10-year probability of hip fracture and the 10-year probability of a major osteoporotic fracture (clinical spine, forearm, hip or shoulder fracture) expressed as a percentage. The tool includes questions about previous dual-energy X-ray absorptiometry (DEXA) results, but does not require this information to estimate risk.

Implementation

With the assistance of the SLH Neuroscience Evidence Based Practice Council, the FRAX tool was integrated into the EMR as an easily accessible link for nursing staff. Education was provided to nurses on the rehabilitation unit by the primary coordinator via handouts and verbal instruction for 3 days at the start of the project period. Those who attended the educational session or reviewed education handouts signed off on the unit roster. The unit manager served as the unit champion and announced patients eligible for screening at unit "flash meetings" prior to every shift Monday through Friday. A FRAX label was also placed next to the patients' room number on the unit census board. Once screening was completed, 2 copies of the results were printed. One copy was placed in the FRAX folder (with a patient label) and one was given to the patient along with a FRAX information pamphlet written by the National Osteoporosis Guideline Group (Figure 2). Data was collected at 1-month (time point 1) and at 2-months (time point 2) by the primary coordinator.

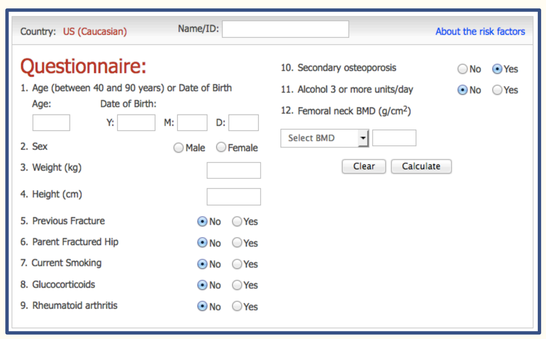

Figure 1. WHO FRAX Screening Tool

Figure 2. FRAX Informational Packet

RESULTS

OBJECTIVES

1. 75% of floor nurses will receive education on FRAX utilization. **NOT MET (12 of 20 received education, 60%)**
2. 50% of eligible stroke patients will have FRAX screening completed and receive education regarding risk at 1-month. **MET (11 of 14 stroke patients screened, 78%)**
3. 75% of eligible stroke patients will have FRAX screening completed and receive education regarding risk at 2-months. **NOT MET (2 of 14 stroke patients screened, 14%)**

RESULTS

- The mean age for all participants screened (n = 13) was 66.9 years old.
- In this small sample, nearly 7 in 10 (69%) participants were identified as having an intermediate (n = 5) or high risk (n = 4) of fracture related to osteoporosis (Figure 3). This suggests that the majority of stroke patients on the rehabilitation unit need either:
  a. Bone mineral density measurement and recalculation of fracture risk to determine whether the individual's risk lies above or below the intervention threshold (intermediate risk), or
  b. Should be considered for treatment without the need for BMD, although BMD measurement may sometimes be appropriate, particularly in younger postmenopausal women (high risk).
- The predominant level of fracture risk for all female participants was "high" (50%, n = 2), while the predominant level of fracture risk for all male participants was "intermediate" (44.4%, n = 4). The overall sample of participants with hemorrhagic stroke (30.8%, n = 4) were predominately at intermediate fracture risk (50%, n = 2), with the overall sample of ischemic stroke participants (69.2%, n = 9) being evenly distributed among each risk group (33.3%, n = 3) (Figure 4).

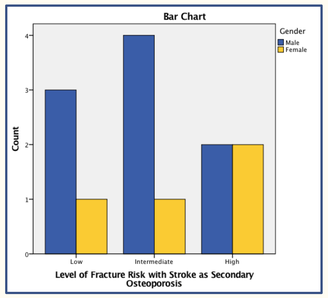

Figure 3.

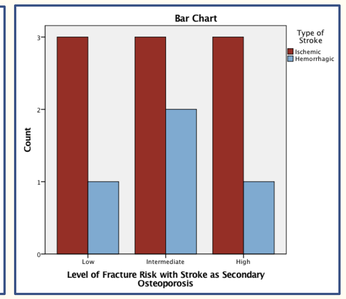

Figure 4.

CONCLUSIONS

There is value in screening stroke patients for fracture risk related to osteoporosis as evidence by the results of the FRAX screening. Identifying individuals at low, intermediate, or high risk can aid in acknowledging risk and guiding treatment/testing recommendations aimed at decreasing risk of long-term complications in the outpatient setting. Continued data collection should be considered to obtain a larger, more inclusive sample. Continued education for staff and patients is recommended and a standardized process for education provided at discharge would ensure understanding of risk and importance of follow up. Integrating the FRAX into the EMR as a "work list" feature for nursing completion and as a flow sheet for manual insert of FRAX scores and level of risk should be considered.

REFERENCES

- Poole, Reeve, & Warburton. (2002). Falls, fractures, and osteoporosis after stroke time to think about protection? *Stroke, 33*(1), 1432-1436. doi:10.1161/01.STR.0000014510.48897.7D
- Carda, Cisari, Invernizzi, & Bevilacqua. (2009). Osteoporosis after stroke: A review of the causes and potential treatments. *Cerebrovascular Disease, 28*(1), 191-200. doi: 10.1159/000226578
- Gaskell, N., Choulerton, J., Shaw, L., & Gregson, C. L. (2016). Fracture risk and bone health following a stroke are inadequately considered by physicians: A UK survey of practice. European *Geriatric Medicine, 7*(6), 547-550.